



# Molecular Foundry Messaging

Branden Brough, Deputy Director

September 16, 2019

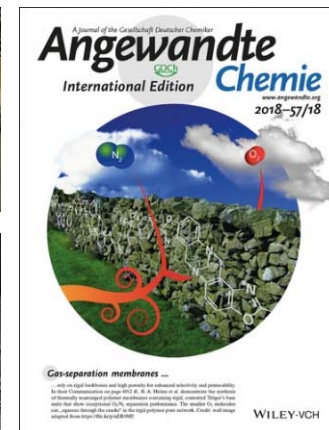
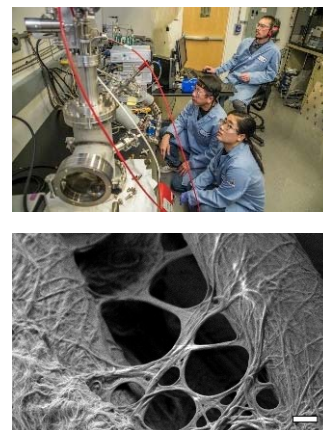
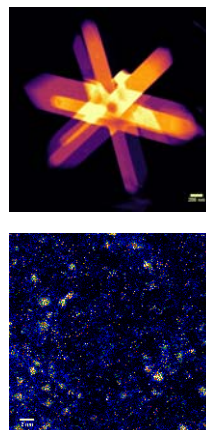
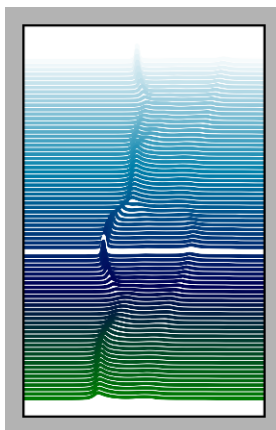
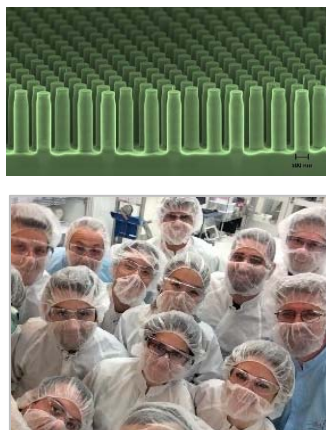
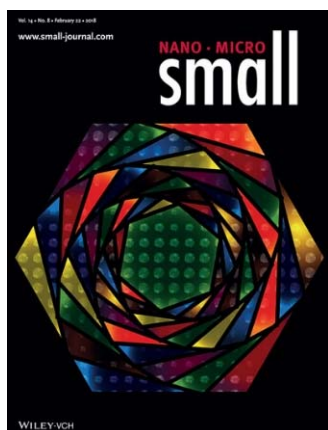




**One of five Nanoscale Science Research Centers (NSRCs) funded by the U.S. Department of Energy**



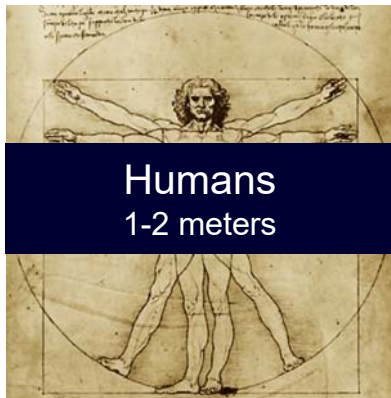
- ▶ **Knowledge-based user facility** that provides state-of-the-art expertise, methods, and instrumentation in nanoscale science in a safe environment free of charge
- ▶ **Multidisciplinary research center** at the forefront of nanoscale science





# Nanoscale Science

## or The Science of the Extremely Small



**Humans**  
1-2 meters

1 meter =  
1,000,000,000 nanometers

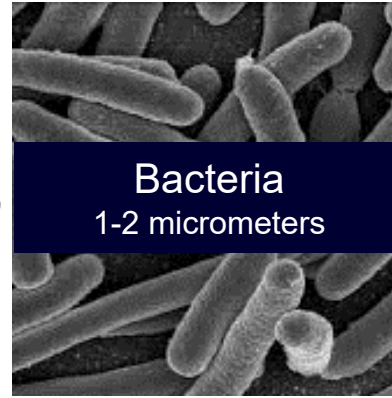
1 m



**Snowflakes**  
2-6 millimeters

1 millimeter =  
1,000,000 nanometers

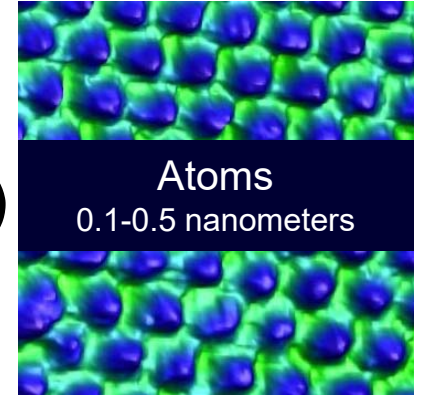
1 mm



**Bacteria**  
1-2 micrometers

1 micrometer =  
1,000 nanometers

1  $\mu\text{m}$



**Atoms**  
0.1-0.5 nanometers

1 nanometer =  
 $10^{-9}$  meters

1 nm

**Nanoscale**  
**<100 nm**

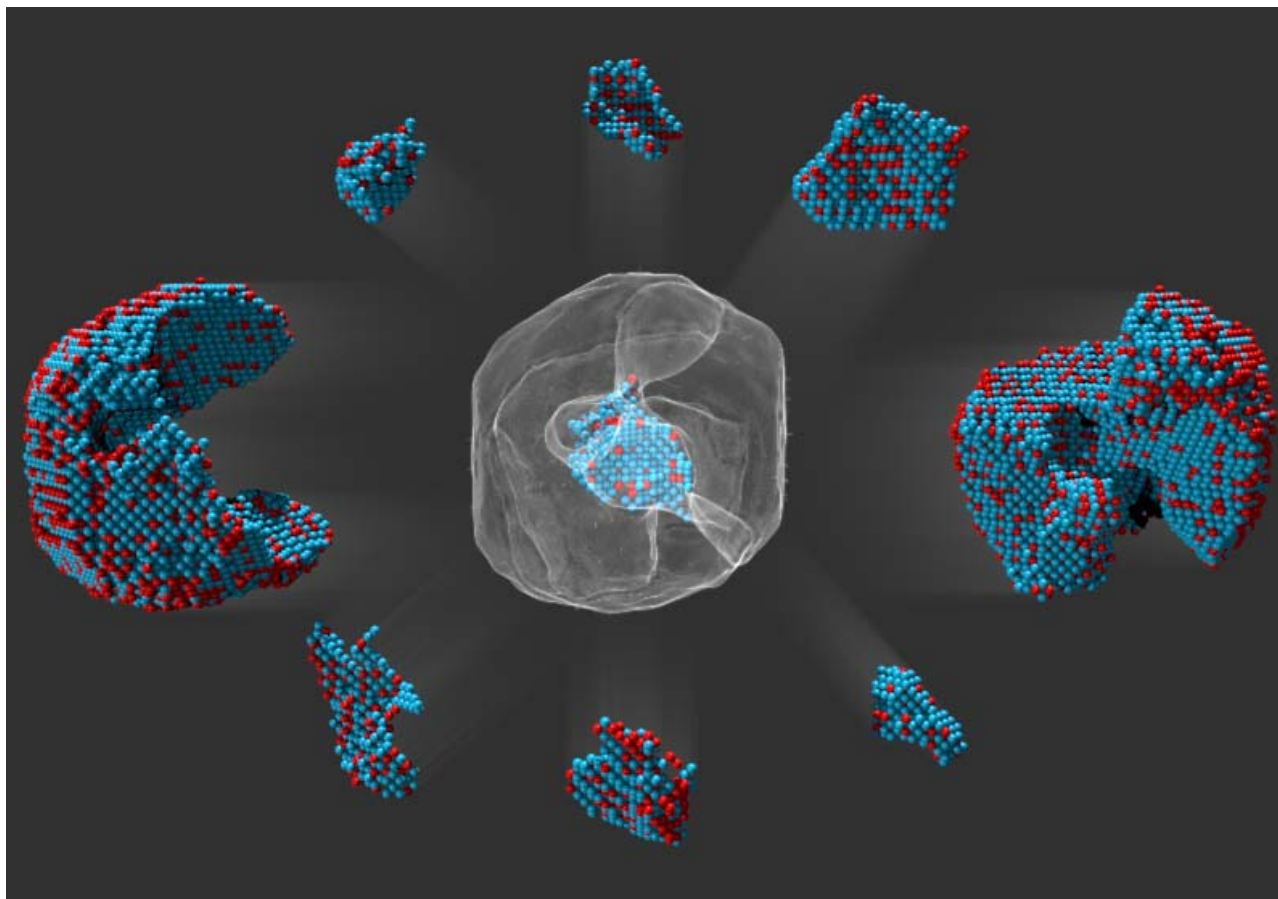
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# Nanoscale Science

## Unprecedented Precision



Imaging every atom in a material in 3D,  
correlating structure with function, and guiding  
design and synthesis

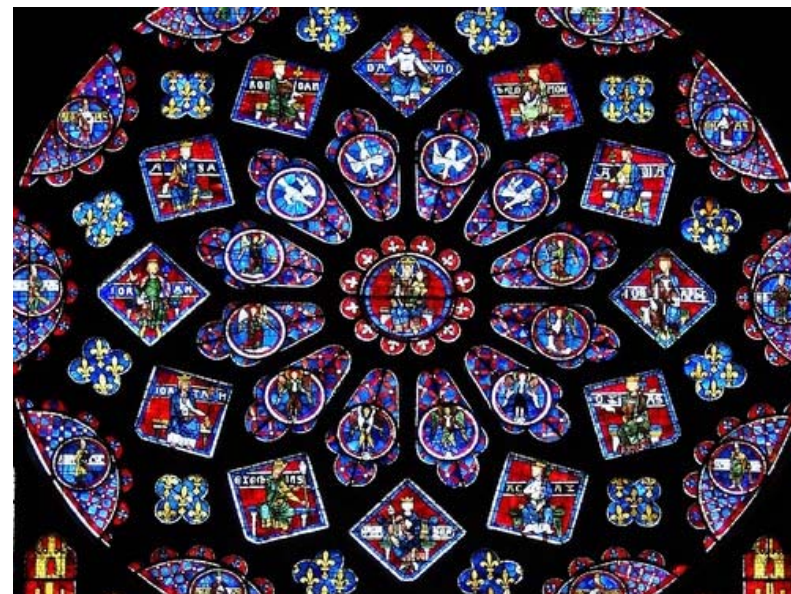
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# Nanoscale Science

## Emerging Properties



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# Science at the Nanoscale

## Nearly Unlimited Possibilities



Longer lasting and more environmentally friendly batteries



Augmented reality



Upcyclable plastics



Brighter and more accurate displays



Organ transplants that last days instead of hours



Cheaper and more efficient solar cells

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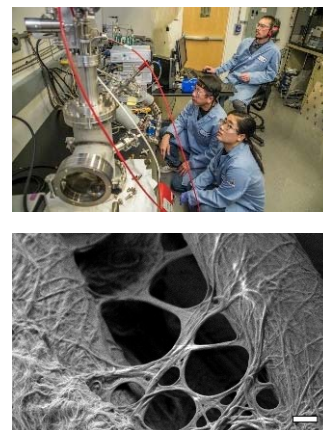
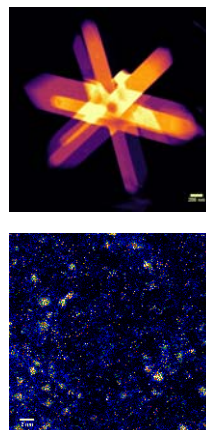
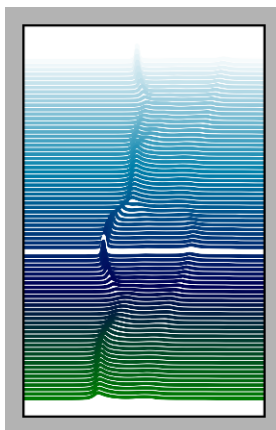
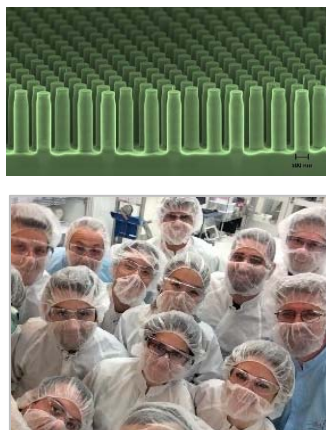
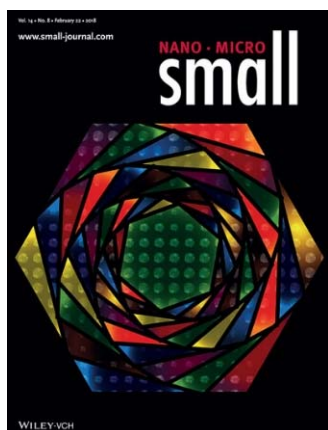




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- **Knowledge-based user facility** that provides state-of-the-art expertise, methods, and instrumentation in nanoscale science in a safe environment free of charge
- **Multidisciplinary research center** at the forefront of nanoscale science





# Matching the “how” with “who” and “what”

A simple tool for researchers (and good reminder for us)



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# Lots of “hows”



## NEWS CENTER

### Plastic Gets a Do-Over: Breakthrough Discovery Recycles Plastic From the Inside Out

Scientists from Berkeley Lab have made a next-generation plastic that can be recycled again and again into new materials of any color, shape, or form

News Release By Theresa Duque • May 6, 2019



### Foundry in Focus News from the Molecular Foundry



Volume 7 - Aug 2019

#### Note from the Director

Dear Molecular Foundry Community,

It is a pleasure to write to you as the recently appointed interim director of the Molecular Foundry. I am honored to be leading this world-leading user community and to have the opportunity to advocate for such an impressive group of individuals, across our scientific, technical and operational staff and our national user community. The Molecular Foundry has been my professional home for over a decade and defined my scientific career in many positive ways. I am extremely grateful to Jeff Neaton for convincing me to consider this alternative career path more than a decade ago, when I joined the Theory Facility. I also want to thank Jeff for his stewardship as director. His legacy of collaboration, creativity and integrity is something that I aim to live up to.



It is good to see so many of you last week at the [Annual User Meeting](#). I'd like to thank the Molecular Foundry's [User Executive Committee](#) (UEC), and in particular the organizing committee members Rosca Toma, Gregory Su and Keiko Munechika for putting together such a stimulating event. I was particularly inspired by the quality and diversity of the research presented throughout the two days, but was most impressed with the energy and engagement of the community, which will inevitably lead to new ideas and growing collaborations between staff and users.

Along those lines, we have some new faces at the Foundry that I'd like to introduce to you. Dr. Ralston joined the Biological Nanostructures Facility as Interim Director earlier this summer.



A New Detector – the 4D Camera – Reaches a New Frontier in Speed

5,559 views • Published on Apr 11, 2019

42 0 SHARE SAVE ...



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# The “how” should be last

**Who** are we trying to communicate to?

**Who** are our stakeholders?

**What** do we want to tell them?

**What** messages will resonate with their interests?

“What boxes do we want to check?”

**How** to do we communicate these messages to these stakeholders most effectively?

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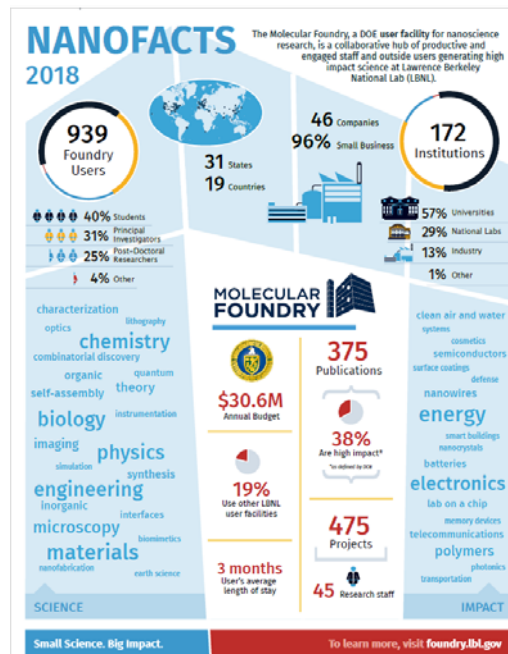
# The “how” should be last

**Who:** Congress

- appropriators, authorizers, champions of science

**What:** remember us?

user facilities democratize science, have nat'l reach  
national labs fuels competitiveness/economy



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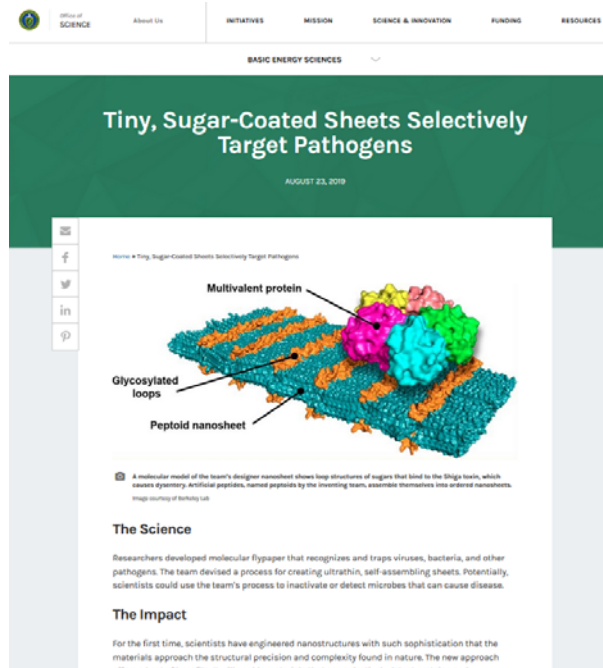


# The “how” should be last

**Who:** DOE

➤ leadership, program managers

**What:** high impact  
fulfilling our mission  
unique and complimentary



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# The “how” should be last

**Who:** Public

- tax payers, community members, students

**What:** the “wow” of science  
real world applications  
unique/necessary role of gov’t-funded research



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# The “how” should be last

**Who:** Prospective Users/Researchers

➤ academia, national lab, industry

**What:** world-class expertise and equipment  
collaborative partnerships  
easy to apply and gain access

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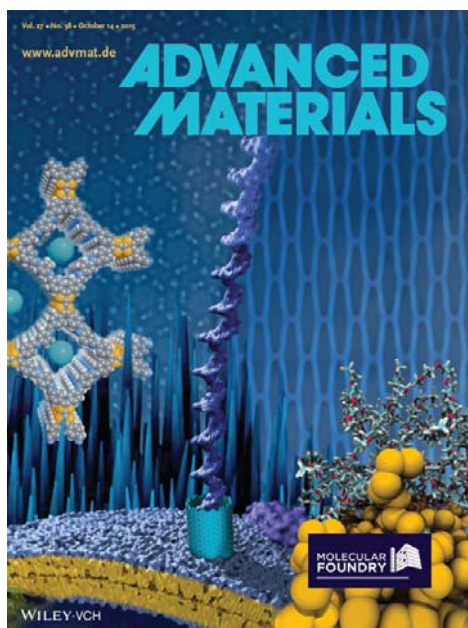
**Seminar Series**  
Chemla Room (67-3111) - Tuesdays at 11:00 AM

**Free and Open to the Public**

- September 10**  
A Single Molecule Electron Source for the Electron Microscope  
Liu-Chang Qiu, University of North Carolina at Chapel Hill
- September 17**  
Tuning Energy Levels, Energy Flow and Disorder in Nanomaterials  
Through the External Environment  
Archana Raja, Molecular Foundry
- September 24**  
Insider to 2D Materials, Nanowires, and 3D Films  
Pamela Cosman, UCSB
- October 1**  
Nanoporous Organic Materials: Design or Discovery?  
Andy Cooper, University of Liverpool
- October 8**  
Colloidal Quantum Materials as Photocatalysts  
Uri Banin, Hebrew University of Jerusalem
- October 15**  
DNA Sequence Tools for Crystallization of Small Molecules  
Shawn Douglas, UCSF
- October 22**  
Characterization of Solid-Liquid Interfaces and New Tools for  
In-Situ Learning Transmission Electron Microscopy  
Katherine Jungjohann, Center for Integrated Nanoscale Technologies
- October 29**  
New Two-Dimensional Materials: Molecular Electronics  
Nathan S. Lewis, USC
- November 5**  
Physics and the Art of Learning: Transferability in Deep Learning from Minimal Observations  
Isaac Tamblyn, National Research Council of Canada

**October 19, 2019**  
Liu-Chang Qiu, University of North Carolina at Chapel Hill

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**FACILITIES**

**INSTRUMENTATION** View All

**RESEARCH AREAS**

**FACILITIES**

**Search by Keywords**

|  |   |  |
|--|---|--|
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|  |   | <br><b>Jeff Urban</b><br>Facility Director, Inorganic Nanostructures<br>jurban@lbl.gov<br>510.486.4266                          |

**Research Made Possible By the Molecular Foundry**

- A knowledge-based user facility for nanoscale science at Lawrence Berkeley National Laboratory
- Provides free access to multidisciplinary expertise and instrumentation

**Proposal calls in March and September**  
foundry.lbl.gov

**Placeholder Image**

Please remove this placeholder and replace with photos of your Foundry collaboration. Photos can be found here: <http://foundry.lbl.gov/people/index.html>

**U.S. DEPARTMENT OF ENERGY** Office of Science

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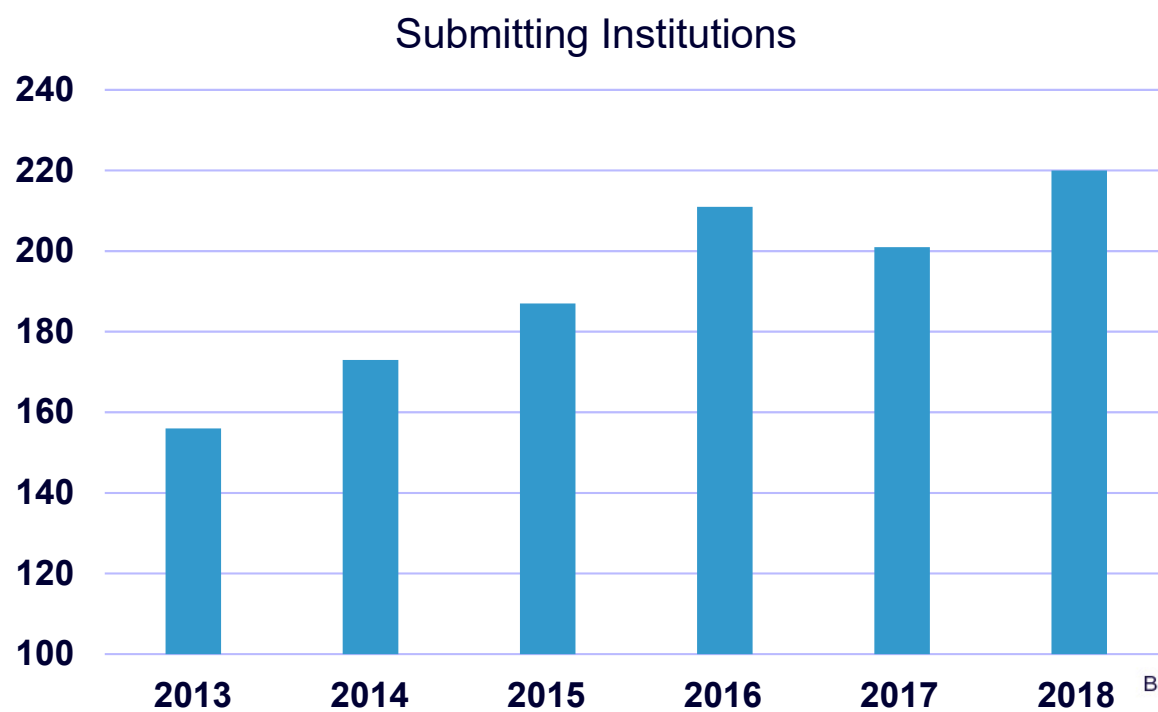
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# Growing Researcher Demand and Awareness

| Proposals to Foundry        | FY 2013-15 | FY 2016-18 |
|-----------------------------|------------|------------|
| Number                      | 1487       | 1975       |
| Submitting States           | 41         | 46         |
| Average Annual Institutions | 172        | 211        |



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# Questions?

